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TECHNOLOGY**

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## **ABSTRACT**

*Online Secondary School System (OSSS) is an information system that is web based. The system is going to be used in secondary schools to handle all the records pertaining the students, teachers and even the employee. The records are to be stored centrally in an online server whereby by accessing the school website one will be able to access the records. The students can view results online. The system notifies the guardian of anything important such as the school fee balance via **email/sms**. The main advantage of the system is the ability to track records easily without much hustle. Decision making is easier since the records are easily retrieved. As long as one has internet access, there is easy access to the system.*

*The system is going to employ iterative methodology till its completion. This is to enable iteration thereby refining every module step by step.*

*Other similar systems include **Edu-Swift school management system** done in **South Africa** and **Campus vue for Kenyatta University**. Unlike this system, these systems offer higher level of functionality owing the kind of user needs they are expected to meet.*

**Keywords; OSSS (Online Secondary School System).**

## CHAPTER ONE

### INTRODUCTION

#### **BACKGROUND INFORMATION**

Assuming it's too costly many schools lose track of the students' record owing to the fact that paperwork is so vulnerable. Also too much workload falls onto class teachers during performance handling. An online system is a system based on tracking the records of all students in the school to ease its day to day activities; it also distributes performance handling evenly over the subject teachers. It's not basically a website but rather an information system that encompasses students, teachers and other financial details. But the main focus is to track student's information both performance-wise and financial details.

As the world of technology evolves shifting from paperwork to an online computer system is a great way of managing records especially those of the students. **Inputting, managing, outputting and supervising of the records** are much easier for the school management. It reduces paperwork thereby reducing fatigue. Performance handling is distributed in such a way that every subject teacher submit results to the system, unlike in a manual system where they are submitted to the class teacher. All the records are centrally located making it more easier tracking of individual records. Tracking of errors made during recording is made even easier especially for the teachers. Another thing that is improved is assessment of student progress being at a few clicks away. Again having **authentication** means that only the right persons can access specific crucial information and depending on his/her role, has the mandate of altering them accordingly.

Generally and in an abstract view, the system is going to help the school management in handling students' performance and financial details in a trackable manner. Being an online system (website) it can be accessed in any part of the world without much struggle as long as one has the right gadget (computer, laptops, phone, ipads etc.) and most importantly the internet. It's going to offer teachers the privilege of accessing and altering information in the student's databases, i.e. inputting the results wherever they are. The principal (or any other person given this mandate) has the full control of the teacher's databases.

## PROBLEM STATEMENT

There has been a concern that many schools in this country are still operating in a more obsolete way of handling their records (LaariaMingaine, 2013). This is through paperwork. Tracking of records is quite tedious and this problem becomes even more aggravated owing to the fact that paperwork is vulnerable to all forms of calamities such as fire or even manipulation. Dealing with paperwork is quite tiresome and storage is also a major problem thanks to space the paperwork consumes over the time. Again too much work especially performance handling is left for the class teacher to analyze, classify and create report cards. As the government is implementing the free secondary school policy, more students will enroll in these institutions and it will be very difficult to handle all their records in manual manner. Also, students waste a lot of time while at home for their fees, this impedes them from performing optimally.

Over the years, the need to manage records and important information has grown because information is what leads us in making quality decisions. Loss of information means that we may make impaired decisions on our part. Improving the way secondary school store their records means that problems such as loss are generally reduced. Paperwork is so vulnerable to loss and therefore should be phased-out courtesy of Information technology which has greatly improved the way people store their records. Paperwork is also very tedious and tracking of various records is time consuming because it isn't in a central location. Improving how we store and manage records in secondary schools is crucial in day-to-day activities of the school.

The solution to the above problem is to generate a solution that can overcome loss of records, reduce space needed to store the records, ease the manner in which we store the records and also putting the **records** in a more **central location for ease of tracking**. Also, have way of **notifying parents** of any important thing in the school about their children. An online based system can handle all this, i.e. a website that not only advertise its school but also has the functionality of all the above. Being an online system it can be accessed even outside the school perimeter especially by teacher who requires updating or altering anything in the students' records provided he/she is connected to the internet. Teachers can log in and submit marks or do any other activity wherever they are. All this will be achieved through restricting control of system resources that include students, employee and the teachers' databases to specific personnel in that school (i.e. teacher, principal or school bursar).

## OBJECTIVES

- I. To ease track ability of records. The fact that the records are centrally located makes it much easier to track and get what records you need with such ease. Printing of report forms will be quite easy reducing manual work.
- II. To evenly distribute performance handling to all subject teacher easing the process.
- III. To notify guardian of any important thing such as fee arrears, meeting etc. and also enabling student view results online while in holidays.
- IV. Access the performance progress of the students. The teacher can easily access the records of every student and analyze his performance progress. This can be used to come up with proper policies of improving the entire performance. Once there is introduction or a change in one performance policy it can be easily analyzed and decisions are easy to make.
- V. **To ease accessibility**, managing, handling and even supervising **of school records**. Being **centrally located** the records can easily be accessed and managed by those who are authenticated to do so.
- VI. **To enable** students view their **results online**.
- VII. **Restricting access** only to those personnel who have the mandate of accessing and altering any form of records in the school. This is through authenticating access to various records by use of password and username. This will ultimately restrict access to only the right personnel.

## JUSTIFICATION

The Online Secondary School System (OSSS) will centralize all the school records in one place. All the records: performance and financial, will be at a central place. Through this centralization of records, it'll be much **easier** to **manage, track, retrieve, update, manipulate and supervise the records**. Getting student's **report forms** will be made quite **easy** by just printing compared to the manual way. Performance handling will be evenly distributed such that class teachers are not abandoned with too much work. **Notifying the parents** of any important **issue** regarding their children will also be implemented via emails/sms. Also, it'll be easier for student to **download learning material from their teacher** and **view results online**. Schools that own websites will be highly suited by this system since it'll be easier integrating the system into the existing website. This will **improve performance** while also reducing much time needed. Teachers can have enough time to concentrate on academic issues which would have been used in tracking various records. For instance, schools with as many students like a thousand plus, require this system to manage the records of each student. Therefore OSSS (Online Secondary School System) is worth a trial.

As many businesses are opting online perspective, it would be absurd not to consider going the online way. As an improvement from paper based to an online system, more room for innovation on how to improve or add more functionality and flexibility of the existing system are going to crop up. This system will also act as a blueprint to many more systems of this nature that will be constructed to aid in handling school records. This transforms into advancement in information technology thereby improving the economy of this country. Our student **community will also embrace ICT** in their day-to-day activities and hence society as whole. Also improvement from manual paperwork reduces the workload and time needed in retrieving or tracking of the records. Space is no longer an issue as long as the records were entered and backed up in an **external hard drive** to be kept by trusted senior personnel.

### SCOPE AND LIMITATION OF THE STUDY

The system can **only** be **economical** when there are a large population involved, in this case the students. It will be accessed by the teachers, students and other personnel such as the school bursar who have the mandate to control all the financial dealings and most importantly the administrator. The students will be able to view their results online like the case of tertiary institutions and also get uploaded learning materials from the teacher. It'll print reports including the report forms giving analysis of the school performance. The system will also aid in notifying parent of any issue like fee arrears and meetings. The system will only be used for handling records of the students and other personnel within the school perimeter. Over sometime the obsolete records that have no importance will be dropped from the system since the domain space will require a lot of money if one was to store all the records. The Teachers will have the mandate of updating the students' records and also printing each ones classroom performance report forms of each student. The administrator will have full control of the student and teachers' database while the bursar will have control over financial database but the principal will have a frequent overview of the database to enhance accountability. As a school website it will encompass all the relevant activities that the head of the school (the principal) deems necessary to be featured.

Limitations will include:

1. Only a large student's population can make the system economical, otherwise a school with a small student's population doesn't need a system to track records of a few students.
2. Internet should be available for the teachers and other personnel to operate the system. This means that they will have to install a network, either WLAN or LAN or buy modems, in order to access the system. This therefore means money will be involved not only in purchasing computers but also in installing network or purchasing of modems.



## CHAPTER 2

### LITERATURE REVIEW

#### **INTRODUCTION**

Adoption and use of ICT in schools in Kenya faces several challenges, including teacher's skills. For schools to benefit from using ICT, qualified teachers are needed (Laaria Mingaine,2013). ICT in schools leads to significant expansion of education and pedagogical outcome which are beneficial to both teachers and students. Therefore, taking into account both pros and cons, ICT introduction in a school setting has more benefits which outweighs the disadvantages.

There are various issues to consider in development of ICT in secondary schools (Stall, 2009),

- Varied contexts necessitate differentiated capacity building
- Capacity building needs to go beyond focusing on supporting instructional improvement to emphasizing learning
- Capacity building needs to address both the present and the future
- Ensuring sustainability depends on a capacity building 'habit of mind'
- Leading school improvement can't be done by one person alone: developing leadership capacity is essential
- A networked society requires lateral capacity building
- Improvement doesn't only depend on individual schools: systemic capacity building is required

A survey by Kandiri, (2012) on ICT access and use in Kenya secondary schools shows that, of 2250 ICT teachers that graduated from universities and tertiary institutions in 2010, 1350 were absorbed in industrial and/or ICT service sectors and 900 went to teach ICT in various educational institutions. Of those in teaching service, 189 were in technical institutions and 711 were in secondary schools. This displays a relatively small number of qualified ICT teachers in Kenyan schools. A report by Ministry of Higher Education, Science and Technology (GOK, 2010) on secondary school teachers' adoption and use of ICT also indicated the number of

teachers skilled in ICT in secondary schools was low. The study revealed that out of the number available, few had ICT training effective in adoption and use of the technology in classroom. Out of 232 teachers in the sample, majority (57%) were reported to have trained at certificate level on basic computer skills, 73% were reported to have acquired ICT training through in-service courses and 43% were trained by private computer colleges.

Another study by Ayere, Odera&Agak (2010) on E-learning in secondary Schools in Kenya, reported that a number of teachers in schools had not received any training in ICT use during their formative years at teacher training institutions before joining the profession. 55% of the sampled teachers stated that they did not receive any ICT training at all. However, the study found that 51% of the teachers had taken self-initiative to undertake ICT training during the last three years they had been employed.

To successfully implement ICT in schools depends strongly on teachers' training on the technology. Drent, &Meelissen, (2008) observed that the level and quality of teachers training has a positive influence on how effective ICT is adopted and used in classroom.

#### **HISTORY OF ICT IN KENYA SECONDARY SCHOOLS**

Effort to implement ICT in schools was first initiated by publishing sessional paper No.1 of 2005 where ICT was given prominence. The idea was to equip public secondary schools with ICT infrastructure and integrate it in existing school curriculum in order to meet the challenges of information society. The publication stated that in every school; teacher, student and communities around it should participate in acquiring ICT skills desirable to benefit from knowledge-based economy by year 2015. Learning and teaching in schools was to be transformed to embrace ICT skills appropriate for twenty first century (GOK, 2005).

In 2006 the government disseminated National ICT policy on education with a section emphasizing that the government will encourage adoption and use of ICT in schools through;

- Promoting affordable ICT infrastructure in schools in order to facilitate acquisition of skills and knowledge through e-learning,
- Creating **awareness of opportunities** offered by ICT in schools,
- Promoting development of local e-content in order to address the needs of individual schools,

- Promoting enabling environment for **integrating e-learning in curriculum** to support ICT in schools,
- Promoting integration of ICT resources with other existing school resources,
- Establishing a national ICT center of excellence where schools can draw parallels, 7) facilitating sharing of ICT resources between schools,
- Promoting public – private partnership in mobilizing resources to support ICT initiatives in schools,
- Promoting and facilitating **training of teachers and school managers on ways to adopt and use ICT through in-service** courses, and
- Facilitating rural electrification and connecting schools to electricity grid in order to support ICT, among other policies (GOK, 2006).

Some of achievement so far include; connecting over 300 rural schools with electricity, equipping over 500 public secondary schools with computers, establishing a unit at Kenya Institute of Education (K.I.E) to provide leadership in implementation of ICT in schools, Launching of e-content for schools in March 2010 by K.I.E, partnering with several organizations and private sector in providing computers to schools, among others (Laaria 2013). These efforts reflect the seriousness the government is attaching to implementation of ICT to schools. Now the focus is on training teachers to adopt and use ICT in teaching.

Despite its importance and strategies developed by government to implement ICT in schools, research conducted in many schools in the country has established that most of them are not effectively adopting and using ICT to support learning, teaching and management as intended (Manduku, Kosgey, & Sang, 2012). Laaria, (2013) revealed that despite efforts made by various stakeholders and importance of the ICT in education sector, the National ICT policy on education of 2006 has not been effectively implemented as was intended. While many countries have reported over 41% adoption of ICT in classroom in public secondary schools, the proportion remains considerably low in Kenya. This may be, because the strategy adopted by the government did not take into consideration teachers' skills, attitudes and reactions towards these new tools.

### **ICT IMPLEMENTATION IN SECONDARY SCHOOL (MANAGEMENT) IN KENYA AND AFRICA IN GENERAL**

Across Africa, many countries have started investing considerable amount of money and designing new policies all aimed at making teachers adopt and use ICT in schools. However, there are many challenges some of which could be attributed to the teachers' skills in using ICTs (Zaman et al, 2011). For ICT to be effectively implemented in schools, teachers should be prepared to face challenges that come with its implementation.

According to a survey done by Kandiri,(2012) there is a very small number of qualified ICT teachers in Kenyan schools. Also, a report by Ministry of Higher Education, Science and Technology (GOK, 2010) on secondary school teachers' adoption and use of ICT also indicated the number of teachers skilled in ICT in secondary schools was low. This therefore disadvantages the implementation of such a system in a secondary school.

Research shows that if teachers perceive ICT programs are either satisfying their own needs or their students' needs, it is likely they would implement it in school. Research suggests that teachers' adequacy, skills, and attitudes influence successful implementation of ICT in schools (Keengwe&Onchwari, 2011). If teachers' perceptions are positive toward use of ICT, then they can easily provide useful insight about its implementation.

A study by Simonson (2008) revealed that teachers' skills, perception and attitudes were related to their use of ICT in teaching and learning. The more skilled teachers were in ICT, the more likely they were to use it in classroom. Further study by Drent&Meelissen (2008) revealed that positive attitude, personal entrepreneurship and **computer experience had a direct positive influence on adoption and use of ICT** by teachers.

### **ROLE OF ICT IN SCHOOL MANAGEMENT**

Research shows that adopting and using ICT in schools leads to significant expansion of education and pedagogical outcome which are beneficial to both teachers and students. When used appropriately, ICT can help to strengthen the importance of education to increasingly networked society, raising quality of education by making learning and teaching an active process connected to real life (Zaman, Shamim& Clement, 2011). ICT seems to change the way teaching and learning is carried out in schools.

There is an important role of school in the academic development of a student. So it is very important for school administration department to manage each and every activity of the school in a proper way and build managed environment. In this modern time most of the schools are using **School Management Software** to manage their activities properly. School management software is a computerized software designed for the school to provide easily maintenance and management facility. This is having great ability to manage large number of resources inside the schools. There are many of advantages of using such type of software in the schools. All of these advantages are helpful for the students, administration department and parents of the students. Some of the most beneficial advantages are (<http://www.educationsystem.in/software-plays-most-important-role-in-schools/>)

- **Time management-** time is the most precious thing in this world because any can earn money but can never bring same time again. This is most necessary it maintain inside the schools because if little time is wasted that can harm much and can result lower for the students as well as the reputation of the school. This software always reminds the students and the teachers not to waste time and complete entire activities in time.
- **Fee Management-** Fee is the only path of earning for the schools so it is very compulsory to pay fee in time for the parents. When the fee of students is generated, software automatically generates mail and sends it to the parents. This also provides online fee payment facility and receipt in behalf of payment.
- **Attendance management-** this is one of the most beneficial activities in the school because it is very beneficial for both the students as well as the staffs to attend the school daily. If any of the student does not appear at the class room this software automatically generates mail and send that to the parents of the students.

In a Case Study done on Kenyatta University Campus Vue by the campus management, they quote that there was a dire need to improve into a more efficient and reliable system of handing university students information since there was lack of consistency of academic and administrative information across the institution. They also argue, without proper handling of the school records there was inability to increase the number of joining students. **Entering and retrieving** information was **labor intensive**, manual process, with double-entry require across systems especially during admissions. Campus vue which was to be introduced was a robust

platform that could centralize and standardize business processes and, most importantly the reporting across the institution. The case study then quotes that the system was to have five main modules to handle various department: modules for admissions, academics, career services, student accounts, and housing. The system was for delivering students with services anytime; anywhere provided they had some internet access. The case study also quotes that the students could view their entire academic roadmap and be able to monitor coursework online. It also quotes that the **deans had a greater visibility** into how **faculty members** are **working** in each course.

According to KamileDemir (2006), being at the beginning stage of the School Management Information Systems, computerization of the school management is the basic subject of today's school management. He argues that development in information Technologies have been impacting upon educational organizations. He also argues that that today is the information age where many technologic developments have been experienced and argues that the biggest risks that an organization could take are to stay insensitive to change. Many significant factors such as continuous developments in information technologies, information exchange, increasing expectations of the society, modern managing perceptions and applications cause organizations all over the world to develop new applications in order to survive (Demir, 2003). Due to their priority in modern societies, Information Technologies have reached a state of high priority in education, too. Recently, contributions of Information technologies to education have been among the most emphasized subjects (Webber, 2003; Flanagan &Jacopsen, 2003; Selwood, 200, Pelgrum, 2001; Yuen, Law & Wong, 2003).

Generally speaking, the reasons to use information systems can be stated as increasing effectiveness at work by processing information, increasing managerial effectiveness by meeting the need for information and gaining superiority in competitions by directing strategies (Yuen, Law&Wong, 2003). School management information systems aim to provide support for the managing and educational activities of the school managers by processing information. Telem (1999) defines school management information systems as “a management information system designed to match the structure, management task, instructional processes and special needs of the school”. As for a broad definition, contributions of the information systems to schools can be defined as making programs more effective, making the teaching process and the changes in

learning environment professional, enabling teachers to exchange their experiences in a more systematic way, working in teams, determining the needs of the students (Gurr, 2000; Pegler, 1992), supporting the school managers and other staff in doing their duties, developing their performances, effectiveness and efficiencies (Telem&Buvitski, 1995). In other words, **school management information systems increase effectiveness and efficiency by saving time** and facilitating development of alternative solutions for sophisticated problems (Visscher&Wild, 1997; Pegler, 1992).

School managers can make more efficient decisions when they get correct and up-to-date information by school management information systems (Christopher, 2003). Decision making is the heart of educational management. Daily, problematic conditions that require decision making are based on the complicated and unexpected nature of school environment. For this reason, as a problem solver, the educational manager has to gather and analyze information continuously (Perez&Uline, 2003). In addition, managers have been required to make more decisions in short times because of the increasing expectations from the educational system (Christopher, 2003). Moreover, decision making has been faster, more frequent and more complicated in schools of today. In order to make decisions under these conditions, gathering data that is continuous, up-to-date and that can be accessed on time and analyzing and using this data is an obligation (Telem, 1991; Gentry, 2005). Success of school development studies are mostly based on data based decision making. However school managers are not able to use the data efficiently in this aspect (Gentry, 2005).

School management information systems provide information and various reports from the database in order to make decisions in line with the aims of the school and facilitate controlling of the activities to achieve the aims (Telem&Buvitski, 1995; Telem, 1991; Christopher, 2003). Information technology helps the manager to access, manage and report the information quickly and easily.

## SIMILAR PROJECTS

### *ORCas*

In a rather similar project, Online Report Card System for Secondary School (**ORCaS**) , the developer (Nurulhuda Binti Abd Kader, 2008) quotes that: many secondary schools were implementing the manual report card which teachers had to write down the marks for each student and the subjects taken one by one. Furthermore, the students' marks also needed to be rewritten in the teaching guide book for teachers and principal's future revision. This surely gave a lot of burden to the teachers and also was an activity which consumed so much time.

Problems occurred when the students' marks kept either in the report card and the teaching guide book was missing and there were no backup of information. To overcome this problem, several secondary schools had taken an approach to use the report card system with the provided database to store all the data.

In the problem statement, the developer reiterates that the current manual system of report card had the following shortcomings;

- **Lack of flexibility:** In the current report card system, the teachers had to insert all the students' information one by one. Furthermore, only the class teachers had to do the task due to that system's limited features. The probability of typing errors such as mistyped the marks to occur was higher and this can cause inaccuracies of the information. The developer quotes it would have been much easier if the teachers including the subject teachers to insert the students' information only once.
- **Increase the class teacher's workload:** The task of inserting all the marks needed to be done by the form teachers due to the lack of functionalities in the current report card system. The subject teachers gave the students' marks to the class teachers and the class teachers are the one who were responsible for inserting all of them into the system. That surely gave a lot of burden to the class teachers and their workload clearly increased.
- **Difficult to retrieve past information**  
The current report card system provided accessibility to the past information only from one computer. If other computers needed the same information, the required database needed to be copied to its specified hard drives to be able to view past information. The developer argues it would have been much easier if all the past information would have



been accessed by many computers at the same time in a digital environment. **Past information** would have been **sufficiently needed by the parents to monitor their children's academic progress from the early form to the current one.**

- **Information can easily be lost:** comparing to the current system of manual report forms in our secondary schools, the developer quotes that the information was easily lost owing to the vulnerability of paper and storage issues. The developer quotes that in their previous system which is standalone, i.e. can only be used in one computer, storage of the records was made in a CD-ROMs. This was a not a recommendable way of storing information which is really needed in the near future. The developer continues to argue that in the system which was developed such issues would be handled. Databases out of use would have been stored in a **hard drive which is then secured in a school safe** to be used to retrieve records in the future.

In the objectives the developer had the following aims in mind:

- To enhance manual paper based report card
- Reduce the teacher's workload by a big margin
- Efficiently deliver information
- Ease accessibility due to online means

In the scope the teachers are given the highest priority in the system. They can enter, manipulate and view the students' results unlike the students and the parents who only have the mandate of just viewing the results.

## **Development**

To develop ORCaS, the methodology that was used is based on the spiral model. The process of the system was represented as spiral. Each loop in the spiral represented a phase of the software process and it splits into four sectors:

- a) Objective setting
- b) Risk assessment and reduction
- c) Development and validation
- d) Planning

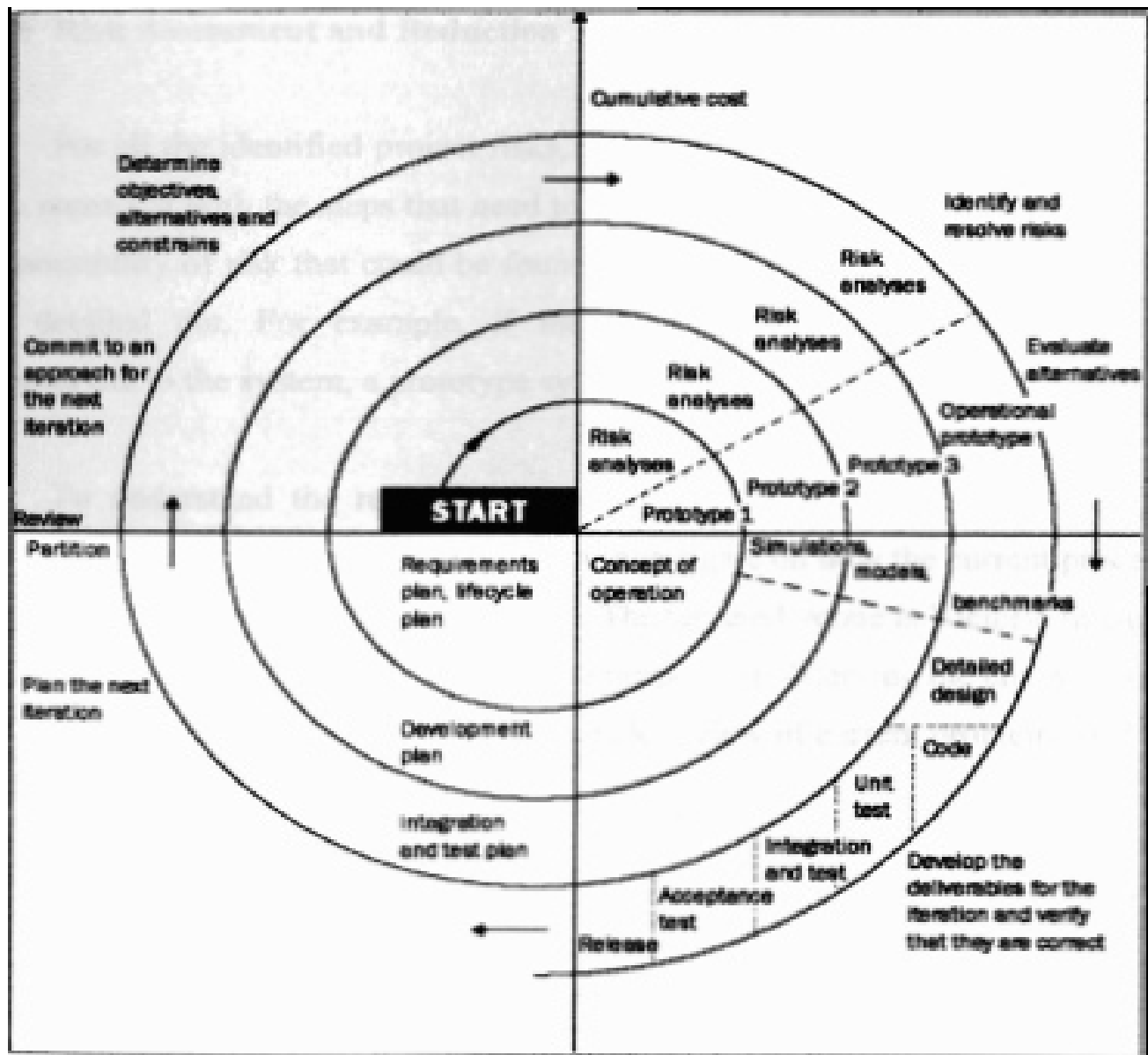


Figure 1: ORCAS system methodology

Java programming language was the language used to develop the system.

In the entire development; planning & analysis, system development, system design, system deployment and databases, the following tools and technique were used:

- Microsoft Office- used in analysis and requirement formulation
- Dreamweaver- used for developing web applications
- JSP(java server page)
- Eclipse-to develop java components

- UML- to design system models
- Adobe Photoshop-editing photos
- Apache Tomcat- acts as a local server during development
- Java DB version- used to create and manipulate databases

Being an online system, **internet was mandatory**. Therefore, hosting of the system on a real web server was therefore a must to enable its access via the internet.

GRADE

A CLASS - REPORT PERIOD 1

Class: ENG SEM FRESH

Teacher Name: Hickey, Inocda

Course ID: ECA2B1

Section No: 71

Save Grades

STUDENT	GRADE	OUTCOMES										RESPONSIBILITIES			
		ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	ENG NA	A	T	B	L
i. Eugenio DIONTE J	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		COMMENTS:													
i. Grystoke SEARRA A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		COMMENTS:													
i. Happyday JOHN F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		COMMENTS:													

Figure 2: ORCAS result submitting interface

*EduSwift school management system ([www.eduswift.com](http://www.eduswift.com))*

The screenshot displays the EduSwift school management system interface for Sekolah Menengah Kebangsaan St. John. The interface is divided into several sections:

- Login Section:** A 'Choose Database' form with a dropdown menu set to 'Default Database' and a 'Proceed' button.
- Main Dashboard:** A header bar with the school logo and name. Below it, a navigation menu includes tabs for Home, Master Data, Timetable, Library, Exam, Fee, Attendance, Infrastructure, Infrastructure, Finance, User Management, and Reports.
- Notice Board:** A section for announcements, including a notice about a drawing exam held on 13th March at 10:00 AM in the Arts Lab.
- Upcoming Events:** A section for upcoming events, including a notice about a Music Competition on 21st Mar 2007.
- Quick Info:** A section providing summary statistics: Total Students (1335), Total Teachers (98), Total No. of Events (3), Total No. of Holidays (23), and Total Users (682).
- Calendar:** A calendar view for the month of March 2007, showing dates and events.
- Class Master Window:** A detailed window for scheduling lessons. It includes:
  - Change Form:** A dropdown menu set to 'T3'.
  - Simultaneous Scheduling for Groups:** A checkbox that is checked.
  - Multi Resource Utilization:** A checkbox that is unchecked.
  - Select Classes:** A list of classes (3S, 3T, 3J, 3O, 3H, 3N, 3K).
  - Select Teachers:** A list of teachers (Ng Sau Peng/ Cheong Pang Kwai, Goh Chee Chiang, Anie Shazleen Abdul Rahman).
  - Select Subjects:** A list of subjects (Geografi, Pendidikan Jasman, Sains, Biologi).
  - Select Groups:** A list of groups (General Group, Agama, Bahasa Cina, Moral, Masa Menyela, Kemahiran Hidup, Add Maths).
  - Select Room:** A list of rooms (3S, 3T, 3J, 3O, 3H, 3N, 3K).
  - Distribution of Lessons:** A section with checkboxes for 'Single', 'Double', and 'Triple' lessons, and a checkbox for 'Allow Breaks (Recess Between Two Lessons)'.
  - Before Official Hours:** A checkbox that is unchecked, with a dropdown menu set to 'monday'.
  - Rule Priority:** A checkbox that is unchecked.
  - Next Button:** A red button labeled 'Next'.

Eduswift school management system is a fully-fledged school management program developed by Elegant Microwebcompany (<http://www.elegantmicroweb.com/>). According to their documentation they argue that education system outlines the backbone of every nation. Technology can play a very crucial role in streamlining the whole system of education. They add that exploring the technological approach to education, streamlining education process and spiraling acquaintance amongst students, staff, parents and managent becomes essential for today's fast growing educational environment.

They also argue that today's schools need to manage more information than ever before. Without a solid internal infrastructure for teachers, administrators and departments to share data, critical school and student information can be lost, or worse-communicated incorrectly leading to a host of problems that can affect your school's image and endurance.

They continue to argue that for a school to remain competitive, it needs a simple solution that can run individual functions, connect their entire operation, use the **web** as a key communication tool and simplify day-to-day operational responsibilities, **giving staff more time with students.**

### The system (EduSwift)

EduSwift was to automate various scheduling activities of a school and optimize the use of premium resources. Using this system it was easy to create timetable which is rather a tedious and time-consuming work for the management. The system emphasizes user friendly interface to enable easy access and use. The application could also support computerized:

- Examination system,
- Grading system,
- Fee payment'
- Student attendance,
- Library usage,
- News and event management (notification via email and sms)

One of the main advantages of the EduSwift school management program was that it was a vital competitive advantage in an environment where education is the main economic drivers.

### SMS FOR PARENT



Figure 3: EduSwift program could notify the Guardian via sms

## SYSTEM OVERVIEW

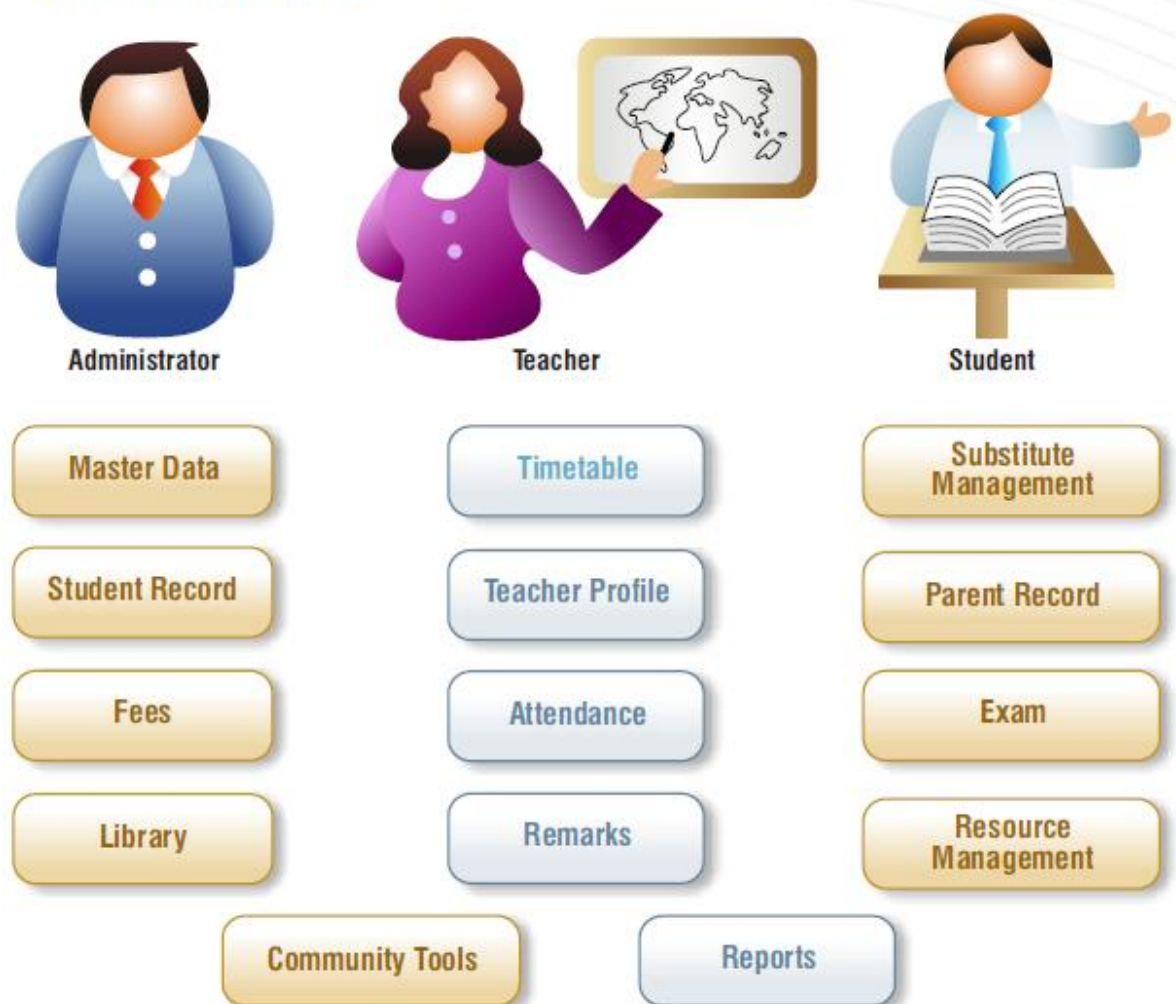


Figure 4: An overview of EduSwift program

## CHAPTER 3

### METHODOLOGY OF OSSS

#### INCREMENTAL AND ITERATIVE DESIGN METHODOLOGY

The Online Secondary School System will employ **Iterative and Incremental** design methodologies to its completion. This will involve breaking the tasks into small increments with minimal planning that do not involve planning. The primary tasks will involve **analysis, design, implementation, testing and maintenance**. These large tasks will break down into smaller tasks that will require iteration over the weeks to produce fine work. Iteration will be of very importance to avoid carrying problem all the way to the last phase of system development. In each iteration, design modifications are made and new functional capabilities are added. Once the system is fully functional, without any defect, iteration will stop and therefore the system can start its production life, which is, serving the customers. Teachers as the main users of the system will largely be depended on in the entire system development. They will provide vital information that is going to enhance more user satisfaction on their part.

The system development procedure will consists of the initialization step, the iteration step, and the project control list. The initialization step will create a base version of the system. The goal for this initial implementation is to create a product to which the use (in this case the teacher) can react. It'll offer a sampling of the key aspects of the problem and provide a solution that is simple enough to understand and implement easily. To guide the iteration process, a project control list is created that contains a record of all tasks that need to be performed. It includes such items as new features to be implemented and areas of redesign of the existing solution. The control list will constantly be revised as a result of the analysis phase.

This methodology will slice the system functionality into increments/iterations/portions. In each increment, a slice of functionality will be delivered through cross-discipline work, from the requirements of deployment. The unified process will group increments/iteration into phases: inception, elaboration, construction, and transition.

- **Inception** will identify the project scope, **requirements (functional and non-functional)** and risk at a high level but in enough detail that work can be estimated. This phase will largely involve analyzing the requirements collected from various school stakeholders.



**Important tool to use:** This will involve administering **questionnaires** to various users who are going to be involved directly with the system (see next chapter). The teachers being the main stakeholders of this project will provide an insight on the functional requirement. This will involve stating the major issue to be addressed that will prove the system to be a success. The questionnaires will be administered according to the role of the stakeholder, in this case; student or teacher or even the parent. This will then be analyzed to come up with a list of the most important aspect that the system must capture during development.

- **Elaboration (design & implementation)** will deliver a working architecture that'll mitigate the top risks and fulfill highly prioritized non-functional requirements of the system. This is basically a trade-off between various factors of the system in order to come up with the most optimal functionality for full user satisfaction at the time of deployment. This is then followed up by putting all user requirements in a design and coming up with a real system that meets those users' demand.

#### **Tools and techniques to use**

**A. Dreamweaver:** Dreamweaver is a programming tool that encompasses HTML, PHP, CSS, JavaScript, XML, ASP.NET among other web programming languages. As a programming tool it helps you generate your HTML code while at the same time showing how the design looks like. This makes it much easier since there is no need of loading your HTML code on the browser in order to see the changes you have made. It makes work easier since it's easier to generate code by clicking on a feature, say a div tag you want to add, and it will automatically appear where you've placed the cursor. It also auto-generates codes that make take a lot of time if you were to code manually. It has a good **code auto-completion function**. Linking to external CSS sheet is also easier while using the Dreamweaver. In a nutshell the tool improves your work while reducing the time needed significantly.

**B. Xampp server & MySQL Workbench:** xampp will act as a server on my computer where I can store HTML and PHP codes and generate them. It will also have databases to that link with the websites. MySQL Workbench is an



alternative to xampp server but can only create more dynamic databases but unlike the xampp server it cannot act as a server.

- C. **Sublime text** is a cross-platform text and source code editor, with a Python application programming interface (API). Sublime Text is proprietary software. Its functionality is extendable with plug-ins. Most of the extending packages have free-software licenses and are community-built and maintained. **Language support;** Sublime Text is able to highlight syntax for a number of different programming languages including ActionScript, AppleScript, ASP, batch files, C, C++, C#, Clojure, CSS, D, Diff, Erlang, Go, Graphviz (DOT), Groovy, Haskell, HTML, Java, JSP, JavaScript, JSON, LaTeX, Lisp, Lua, Makefiles, Markdown, MATLAB, Objective-C, OCaml, Perl, PHP, Python, R, Rails, Regular Expressions, reStructuredText, Ruby, Scala, shell scripts (Bash), SQL, Tcl, Textile, XML, XSL, and YAML. In addition to those that are included with the initial package, users can download add-ons to enable support for other languages or syntaxes. This makes it a more dynamic code editor with **high level auto-completion functionality**.
- D. **Photoshop:** this tool will be very important in **designing the layout** of the website according to the users requirements prior to actual coding of the system. The user is usually provided with various layouts, say three, and he/she chooses the one that pleases her needs while at the same time requesting for customization of some parts. This eventually gives the layout that is transformed into HTML and PHP web pages.
- E. **Smart-Draw/E-draw:** it is a software used to designing UML diagrams such as the DFDs, ERD and Use-case among others during design period.
- F. **Filezilla:** this is a tool used to upload the website to a server by giving it domain name and space. But for this case a xampp server will act as the real server.

- Transition is the **deployment** stage of the system. It will deliver the system into the production operating environment.

Each of the phases may be divided into 1 or more iterations, which are usually time-boxed rather than feature-boxed.

The reason for deploying iterative and incremental design method is basically because it'll meet the entire user requirement (functional and non-functional). Iterations which are cycles of repetitions are going to refine the system through its development such that the system will most probably meet its purpose: the functional and non-functional requirements. The iterative model keeps on improving the system step by step hence it is easy to track defects at early stages of system development. This will avoid downward flow of the defects which will increase time and cost in electrifying them. The iterative model also helps in getting the feedback from the users while presenting them the system blueprint. This is followed by a series of iterations to refine the system during its development.

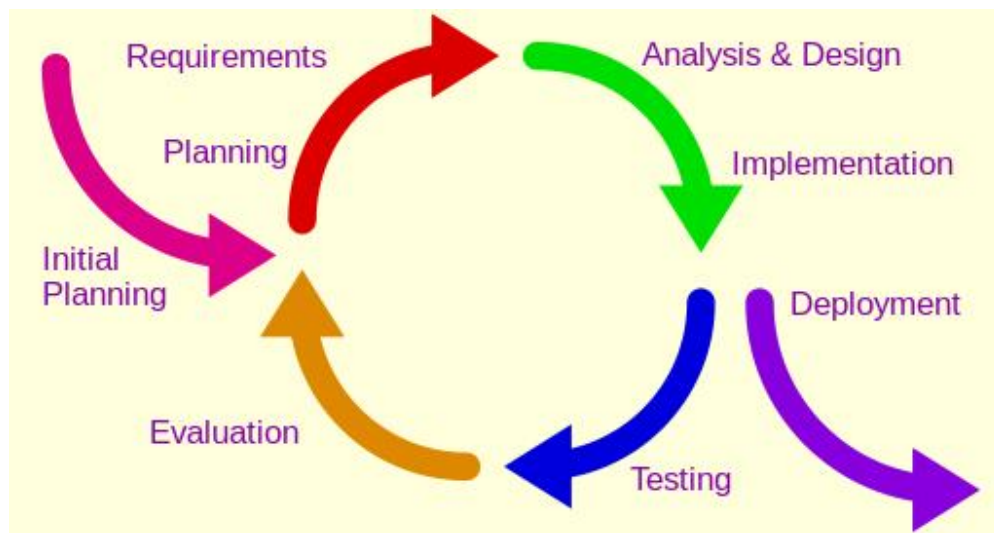


Figure 5: System development lifecycle

Activity		Oct		Nov				Dec					Jan				Feb				Mar		
	W e e k	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	D a t e	20	27	9	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23	2	9	17
Requirement collection																							
Learning tools for use																							
Researching on the project																							
Designing the interface																							
Developing the system																							
Testing the system																							
documentation																							

## GANTT CHART OF THE SYSTEM DEVELOPMENT

### PROJECT BUDGET

Activity/Tool	Approximate Cost (Ksh)
Dreamweaver	2,000 /-
Sublime Text 2	1,500/-
Adobe Photoshop	3,000 /-
MySQL Workbench	2,000 /-
Modem & Internet Bundles	7,000 /-
Photocopying & Binding of reports	500 /-
E-Draw	2000/-
<b>Approximate Total Cost</b>	<b>20,000 /-</b>

## CHAPTER 4

### SYSTEM ANALYSIS AND REQUIREMENT MODELING

#### **WORKING OF THE CURRENT MANUAL SYSTEM IN SCHOOL MANAGEMENT (REQUIREMENT SPECIFICATION)**

Currently, most schools use manual system in performing majority of tasks such as recording performance and also fee record keeping (according to the fact findings). Every subject teacher must hand over every student marks in that particular subject to the class teacher. The class teacher then has all the manual work of calculating and adding up marks to come up with the student mean grade. This is then recorded manually and the parents have to come all the way to pick the report forms during the holidays or at the beginning of the term. Student on the other hand must wait for the report forms to know their results.

Managing of fee records is also manually done by the bursar who keeps track of the records manually while also doing the needed arithmetic manually. The bursar must track fee records manually to establish those students with certain fee balance pending.

#### **Limitations of the current manual system in school management**

- The current system is **prone to human error** that comes after doing so much arithmetic involving many student records.
- Keeping track of all students records manually is very **tedious** work, it involves tracking of all manual record.
- Tracking of manual record involves a lot searching of records which proves to be a **time consuming** activity. Even the manual recording and arithmetic involved consumes a lot of time.
- Manual records are **prone to all forms for of destruction** such a theft, fire or even malicious damage.
- Manual system raises **security concerns** to some degree. Malicious **manipulation of records** can occur through unauthorized persons.

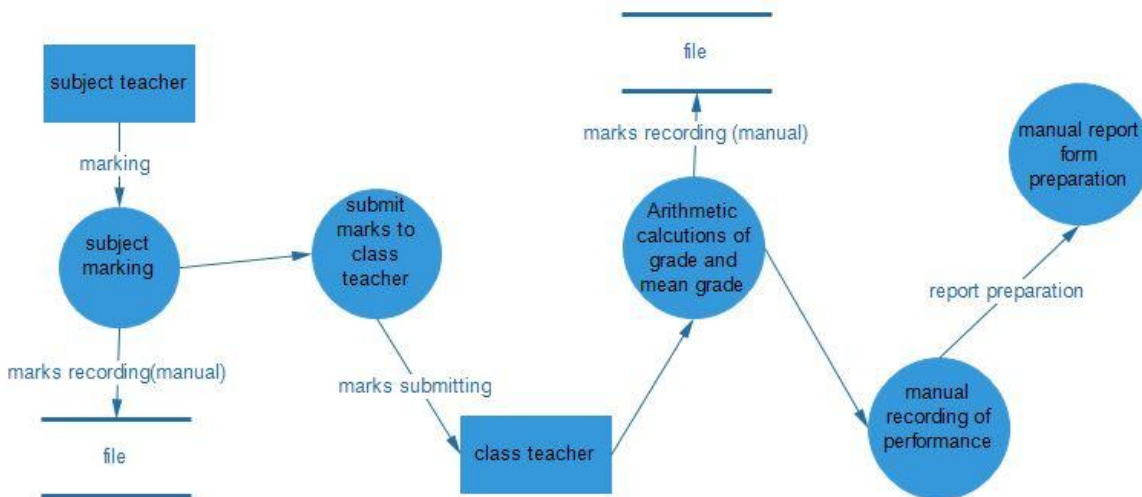


Figure 6: A level 2 DFD of the current manual performance system that requires a lot of work from the stakeholders involved

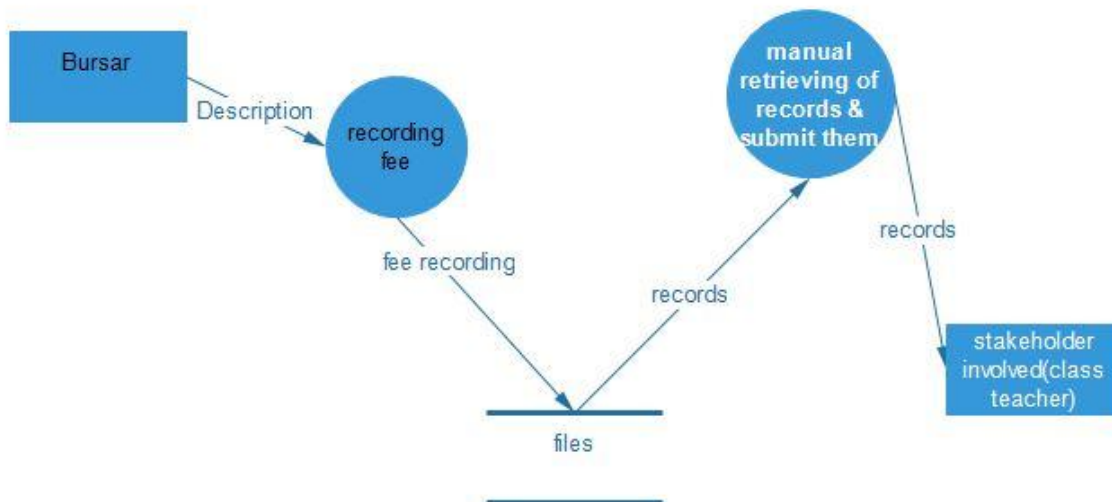


Figure 7: a level 2 DFD that demonstrate current manual fee management system

## **THE PROPOSED SYSTEM**

The new proposed system is an online management system. It encompasses performance handling and a small part that involves finance. It offers high level of security in that only an authorized party can gain access to whatever department resources. Being an online system means that you can access it anywhere provided you have an internet source. It centralizes various functions that involve performance handling.

In performance handling every teacher who teaches any subject submits the results to the system reducing the work load on the class teacher. The system offer high level of flexibility since it can allow multiple values to be inserted simultaneous significantly reducing time. This makes performance handling distributed evenly such that the class teachers are not loaded with a lot of work. Since our schools are based on competitiveness to motivate the kids. The system analyses results and can produce needed report such as the class/block performance list, generate lowest and highest achievers in more simple track able manner through classification. Again the class teacher then emails the result to the guardian. Student profile is also easily accessed. This system makes the process fast and simplifies results handling significantly. The students can log in to the system, view their results and download revision materials uploaded by their class teachers.

In financial department, school accountant submits amount paid by the guardian to the system which generates a report to be sent to the guardian parent increasing transparency. The report includes the balance remaining and time in which the fee slip was submitted. The system also generates students with a balance below a certain amount and notifies the guardians via email of the pending balance and that their kids risks to be sent for the fee arrears after a certain ultimatum.

### ***User Requirement Definition***

The user requirement for this system is to make the system fast, flexible, less prone to error and save the time.

- The system can reduce workload on the class teacher since they are not given any results by the subject teacher after marking. Instead, the subject teachers feed the results into the system by themselves anywhere.
- A lot of time should be saved in the process of handling performance. After submitting results, the system should do all the analysis and report form production.
- The system should be able to classify student based on their performance.
- Student should offer their details to the system for the system to be able to track them and produce the needed reports (Performance).

- The system should offer high level of authenticity such that only the authorized party can access certain system resources by use of log in systems.

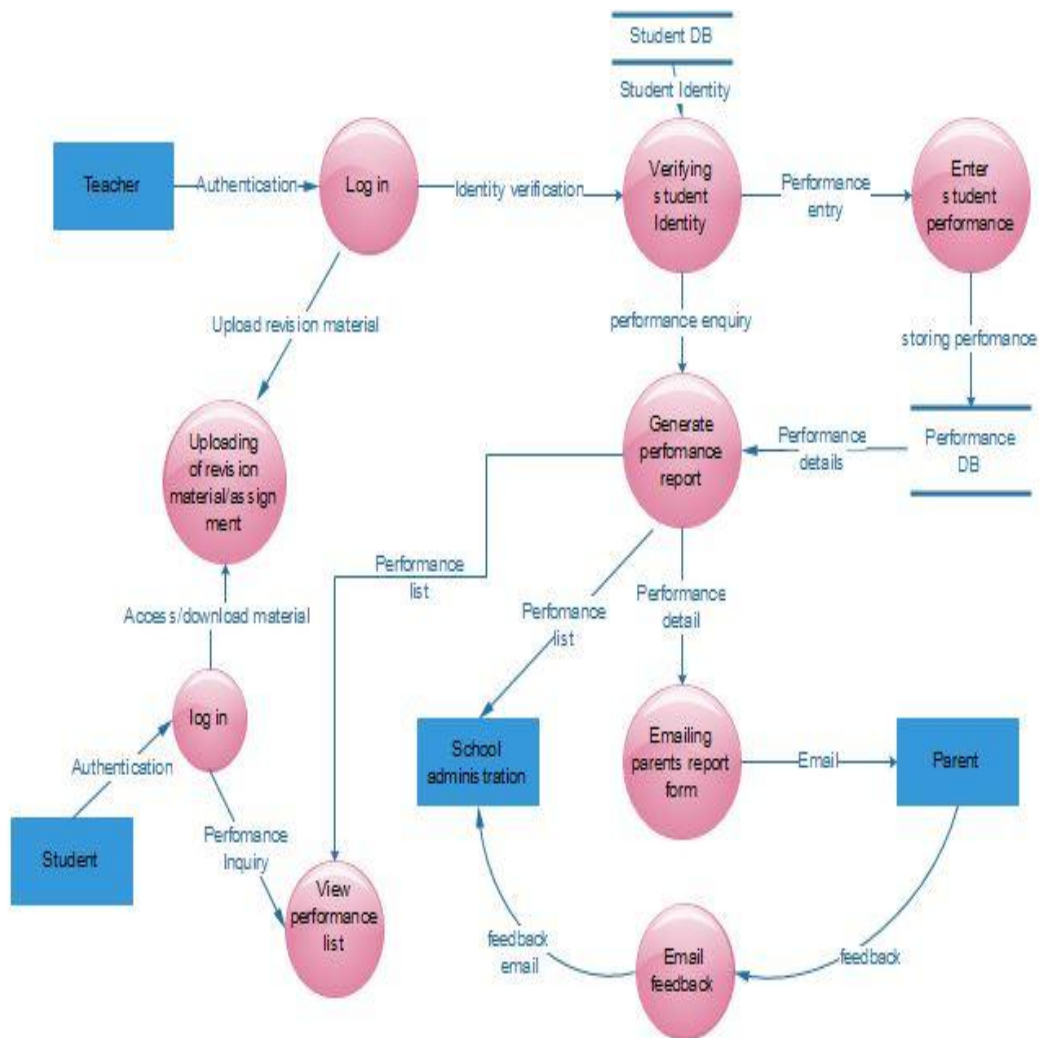
### *System Requirement specification*

#### **Functional System Requirements**

This section gives a functional requirement that applicable to the OSSS.

3 sub modules,

- ✓ Teacher module
- ✓ Student module
- ✓ Accountant(Bursar) module
- ✓ Administrator module
- ✓ **Teacher module:** the teacher logs in into the system and; submit results of a subject, view the profile of a student and class performance, send results to the guardian, view student performance list(s) and upload revision for the students. In the classification page (desc. below) the teacher can view most failed student, student above certain points/grade or even block (stream) performance. **Privileges:** can change password/username combination.
- ✓ **Student module:** the student logs in to the system; views his profile, performance and uploaded materials for downloading. **Privileges:** can change password/username combination.
- ✓ **Accountant (Bursar) module:** Bursar logs in to the system and records money paid for school fee by the guardian. He/se generates a report that is sent to the parent/guardian containing the amount paid and the pending balance. Warn parents of a pending sending-off of their kids for fee arrears. Issues the party (e.g. principal) involved of the list of student with a with critical pending fee arrears. **Privileges:** can change password/username combination.
- ✓ **Administrator module:** the administrator logs in; registers a teacher, student, school accountant and a parent into the system. If a party leaves the school, the admin is able to remove all the party's record and store them somewhere if required in future. He/she does the needed database maintenance and updating school web pages with upcoming events and other issues of importance. **Privileges:** The administrator has the full fledged rights over the OSSS.



Teacher enters performance data of the student, generate the performance report (i.e performance list, report form) , sends report form to the parents and also upload learning materials for the student.  
 Students log in to the system, download revision materials uploaded by the teacher and also view performance the parent also emails feedback or any other inquiry of importance.

Figure 8: Level 2 DFD that describes the OSSS performance module



## Non-functional requirements

Non-functional requirements involve monitoring various aspects of the OSSS. These are qualities or standards that the system need to comply with, but which are not tasks that are automated by the system i.e. the look and the feel of the system.

- ✓ **Security requirement:** Every user of the system must bear an account for their log in. This is mandatory to enhance security on the system. User passwords are encrypted to further improve on system security.
- ✓ **Performance requirement:** OSSS must support multiple users at a go provided one has an internet source. Database should accommodate not more than 10000 records according to apache specification. Databases should be backed up as a **safety precaution**.
- ✓ **Usability**-the users of the new system uses and navigates the system with ease or without any problem
- ✓ **Maintainability**-the new system accommodates modifications that may be caused by technology changes, environment and user needs

## FACT FINDING AND DATA ANALYSIS

### Questionnaires

Questionnaires method was one of the method used in fact finding mission. They were administered according to the role of the stakeholder to be involved after successful deployment of the system. They included teachers, student, parent and the bursar.

#### Merits of questionnaires

- Most importantly the respondent involved is able to think through a question and come up with a definite answer.
- It offer enough time for any change if the stakeholder being involved thinks otherwise of the answer he/she had given
- Stage fright is minimized since there is no face o face interaction
- Easier to submit via online means unlike interviewing

#### Criteria

- Five teacher
- Four students
- Two school accountants
- Three parents

A total of **14 respondents** were involved during the fact finding mission.

#### **Questions to the teacher involved**

- ✓ form of performance storage used
- ✓ reliability ,efficiency and effectiveness of the said method
- ✓ shortcoming of the old system
- ✓ adoption of a new online management system

#### **Questions to the students involved**

- ✓ time response between doing exam and getting the results
- ✓ reliability ,efficiency and effectiveness of method used (manual performance management system)
- ✓ adoption of the new system

#### **Questions to the accountants involved**

- ✓ Reliability, efficiency and effectiveness manual method of storage used.
- ✓ Benefits and effects of the new system.

#### **Questions to the parents involved**

- ✓ Reliability, efficiency and effectiveness manual system (both performance and fee system)
- ✓ Benefits of the new system

### ***Findings and Analysis***

Two of the teachers involved were using a computerized system to manage results. Generally the systems were helping but the main problem was that it was fixated on one computer and results for analysis were submitted in turns. Interaction with the system was minimal and therefore monitoring of records submitted was hard to come by increasing chances of error. The other three teachers used manual means to enter, retrieve and analyse results. They argued that if the number of student was high managing records especially for the class teachers would be hectic. Manual system was unreliable and decentralized, retrieving and analysing of performance was time consuming for the teacher. They also argued that for proper learning the teacher-student interaction must be increased to enable positive performance.

Only one teacher was against the new system. Financing the system development of the system especially for middle/lower- class school was the major obstacle on his view. Also many stakeholders had little ICT knowledge. He also argued school with a few number of students would not feel the effect of such a system though he appreciated its ubiquitous nature provided if you had internet with you. Three of the teacher supported the proposed new online system though they argued only bigger school would reap great benefits from such a system. They argued that the system would bring in a new chapter in the secondary school management. With the increasing level of ICT in the entire globe, they argued it was a positive move that would have positive effects on the students and society as whole. Notifying parents on any issue including sending performance via bulk e-mails was a good approach. One was torn between about the issue.

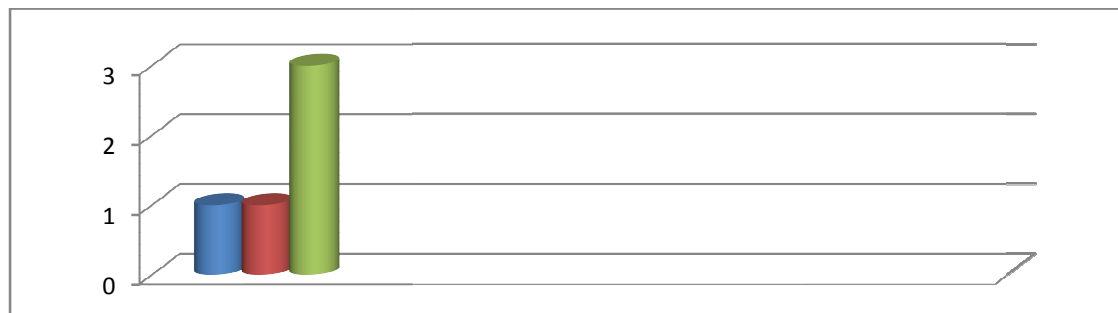


Figure 9: The distribution of supporting and non-supporting teachers

Key: -Not clear(1)

-non\_supporting (1)

-supporting (3)

Time response for results was a bit large; the entire student respondents argued that if it were possible, getting results earlier was a good idea. This would give them time to analyse their own weaknesses and strength and come up with stringent counter measures especially during their holidays. They found the proposed system quite interesting since viewing of results online was a better idea. They argued that it was going to trigger an 'ICT' culture in schools where ICT is regarded a later activity in life. Downloading revision materials from the online system was a good idea.



Figure 10: Distribution of supporting and non-supporting students

Key: -Not clear

-non\_supporting

-supporting

All the respondent school accountants (bursar) involved, had diverging arguments. One of them argued that although the current system is a bit tiresome implementing the new system may threaten their jobs since their employer may consider them redundant and lay off some. The other one argued that the system would be a good idea in bigger schools where manual work grows to uncontrollable level where errors are

prone. Both argued that notifying of the paid amount and pending fee to the parent/guardian was an awesome idea since notorious kids could lie about the issue, even misplacing receipts deliberately to conceal evidence.

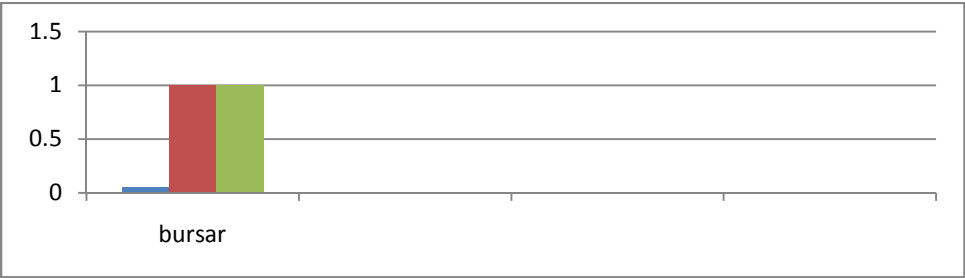


Figure 11:Figure 4:Distribution of supporting and non-supporting school accountants(bursar)

key –Not clear

–non\_supporting

–supporting

The entire parent respondents involved were in support of the new proposed system as long it will lead to positive reaps upon their children. Notification of any issue fee arrear or performance was a good idea that increased their interaction with the school management.

## CHAPTER FIVE

### SYSTEM DESIGN

System design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements through system modeling. One could see it as the application of systems theory to produce development. The design of this system will be user friendly. It shall be designed in such a way that employees will be able to navigate easily through the information supplied on the system.

In other words, system design consists of design activities that produce system specifications satisfying the functional requirements that were developed in the system analysis process. System design specifies how the system will accomplish. System design is the structural implementation of the system analysis.

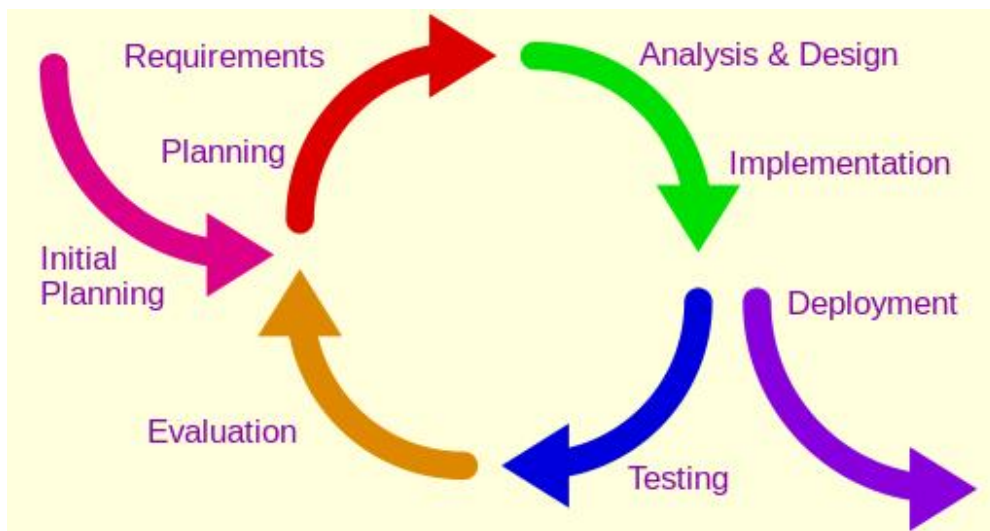


Figure 12: Incremental design methodology used involving vital stages

The diagram above is a system development life cycle that illustrates how the design of the project is broken down into five different phases, which are Project Planning, Requirement Gathering, Analysis and Project Design, Project Implementation, Deployment and System Testing and Evaluation (involving Maintenance and System Upgrading).

Establishing the user is the first vital step which is then followed by establishing functional and non-functional requirements from these users. A user prototype is an important aspect during development which is then refined via iteration taking into account user views.

Phases of analysis, design and implementation were performed iteratively until users and designers agreed on a final system specification. At this point, the project could move to the final implementation phase. Iteration is important since it aid in refining system functional requirements to map those in the system specification.

## **SYSTEM MODELLING**

During the system requirements and design activity, systems may be modelled as a set of components and relationships between these components. These are normally illustrated graphically in a system architecture model that gives the reader an overview of the system organisation. System modelling helps to give more detailed system specifications which are in form of graphical representations that can describe problem to be solved or the system that is to be developed. Because of the graphical representations used, models are often more understandable than detailed natural language description of the system requirements. Examples of such modelling tool are a System DFD, use case diagram, flowchart and ERD.

### ***SYSTEM DATA FLOW DIAGRAMS (DFDs)***

A **Data Flow Diagram (DFD)** is a graphical representation of the "flow" of data through an information system, modelling its *process* aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs can also be used for the visualization of data processing (structured design).

A DFD shows what kind of information will be input to and output from the system, where the data will come from and go to, and where the data will be stored. It does not show information about the timing of process or information about whether processes will operate in sequence or in parallel (which is shown on a flowchart).

Below are some of the DFDs that depict how OSSS system interacts with its users.

## Level 2 decomposed DFD of the system

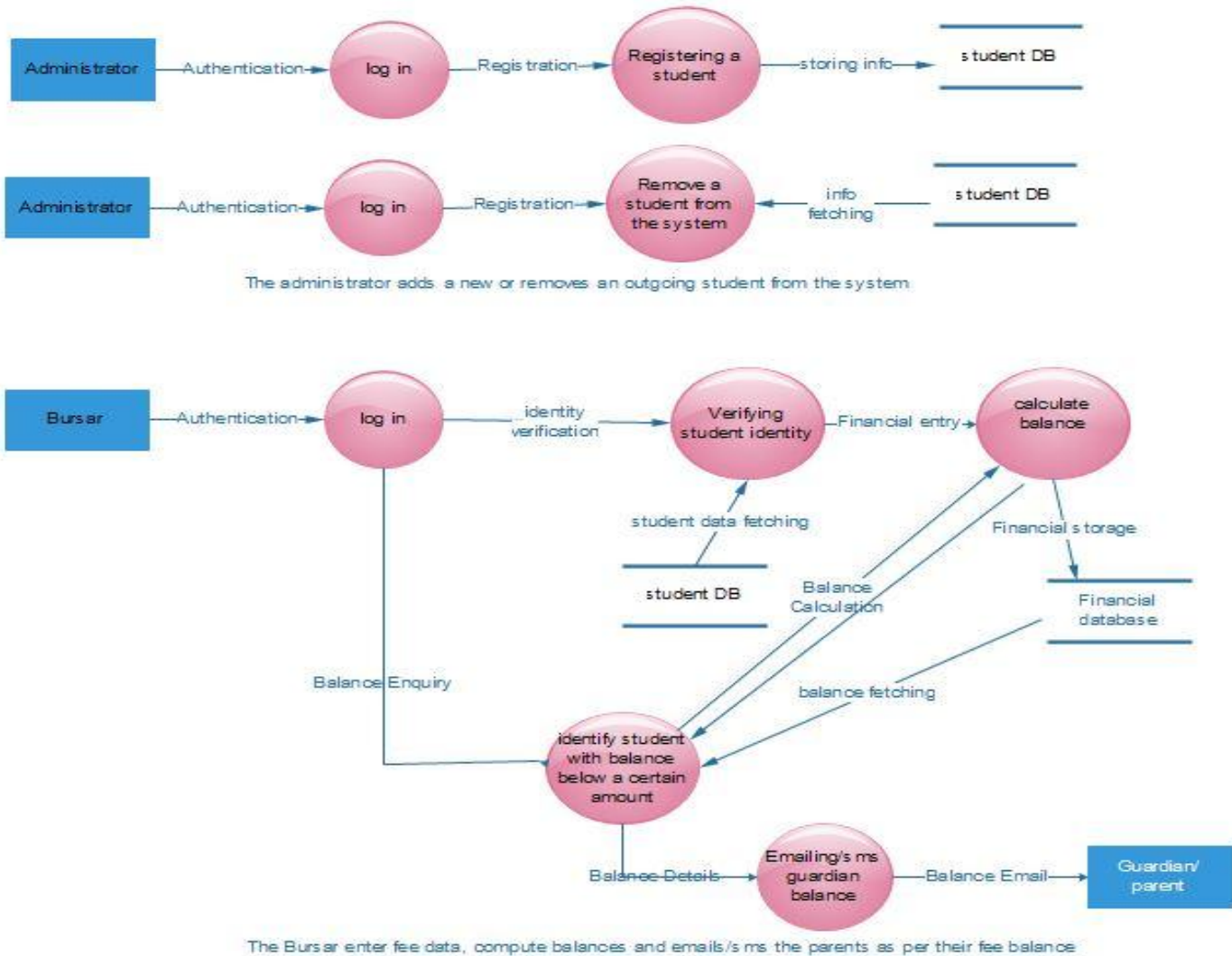
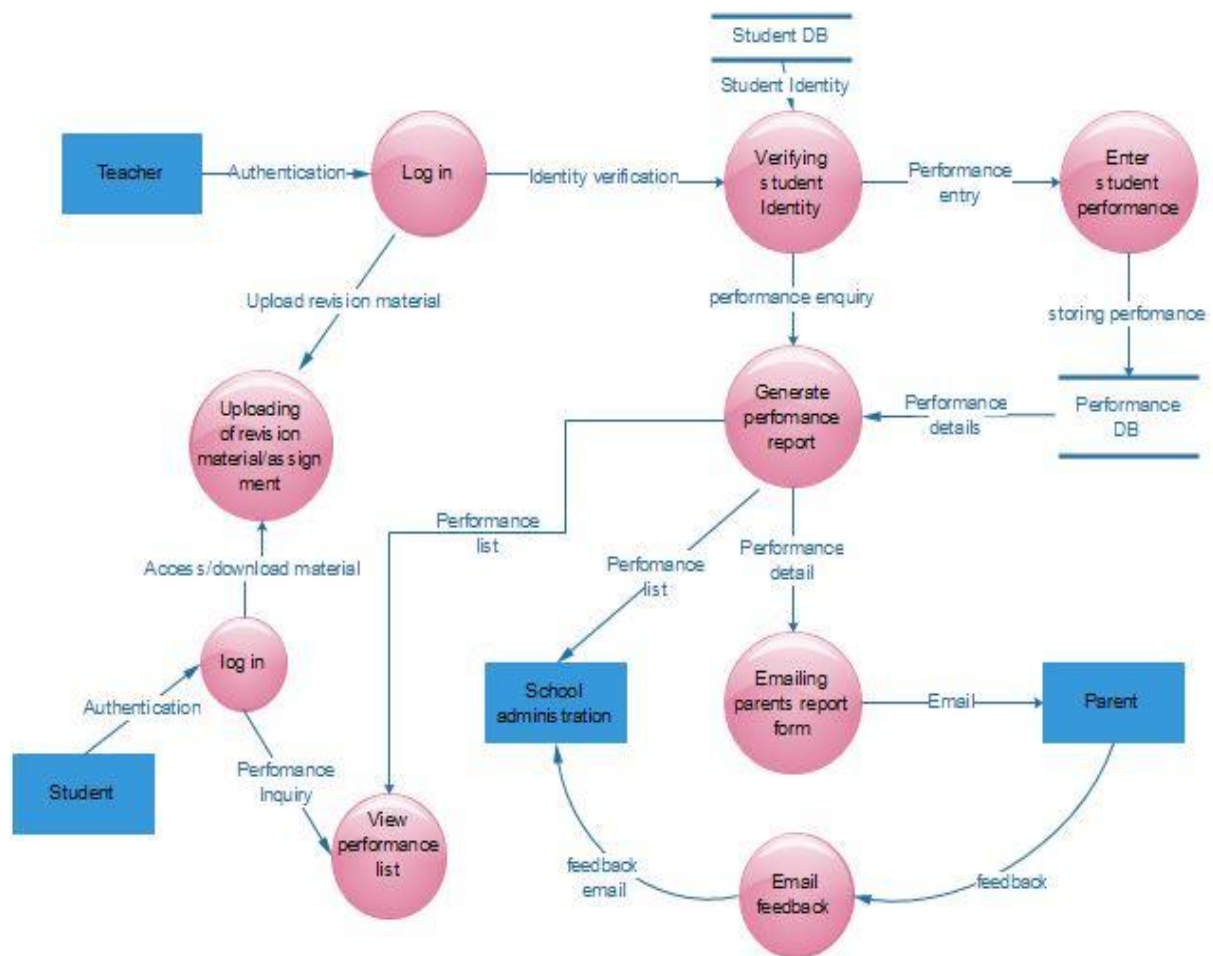


Figure 13: This system DFD depicts how a user is registered/ removed from the system and how bursar interacts with the system

The above level 2 DFD show how an administrator logs in to the system and add/ removes a user account be it a teacher, student or an outgoing school accountant. The administrator has the mandate of maintaining various aspects the system when need be. For instance, dropping some obsolete databases or even updating new events on the school home page.

The Bursar (school accountant) on the other hand, submits school fee paid to the system. He/ she then generate a report that is emailed to the guardian to inform them of the amount paid on what time and the remaining balance. On another instance, the bursar can notify the parent/ guardian of a pending send-off, in cases of critical balances, giving them a certain ultimatum.



Teacher enters performance data of the student, generate the performance report (i.e performance list, report form), sends report form to the parents and also upload learning materials for the student.  
Students log in to the system, download revision materials uploaded by the teacher and also view performance the parent also emails feedback or any other inquiry of importance.

**Figure 14: This level 2 DFD depicts major activities that encompass the performance module (performance handling)**

The above DFD depicts activities involved in performance module (handling). A teacher logs into the system feed the marks into the system. Analysis and classification then follows which can be viewed easily by the teacher inform of performance lists. The teacher can generate a performance report which is then emailed to the parent thereby increasing reliability.

On another instance the teacher can upload revision materials for the students. Every subject teacher can upload a material on the subject which will be downloaded only by the student of class he/ she



teaches that subject. For instance, if Mr X teaches English Class 4w, only student from that class can view the material uploaded by their teacher on their account and download them.

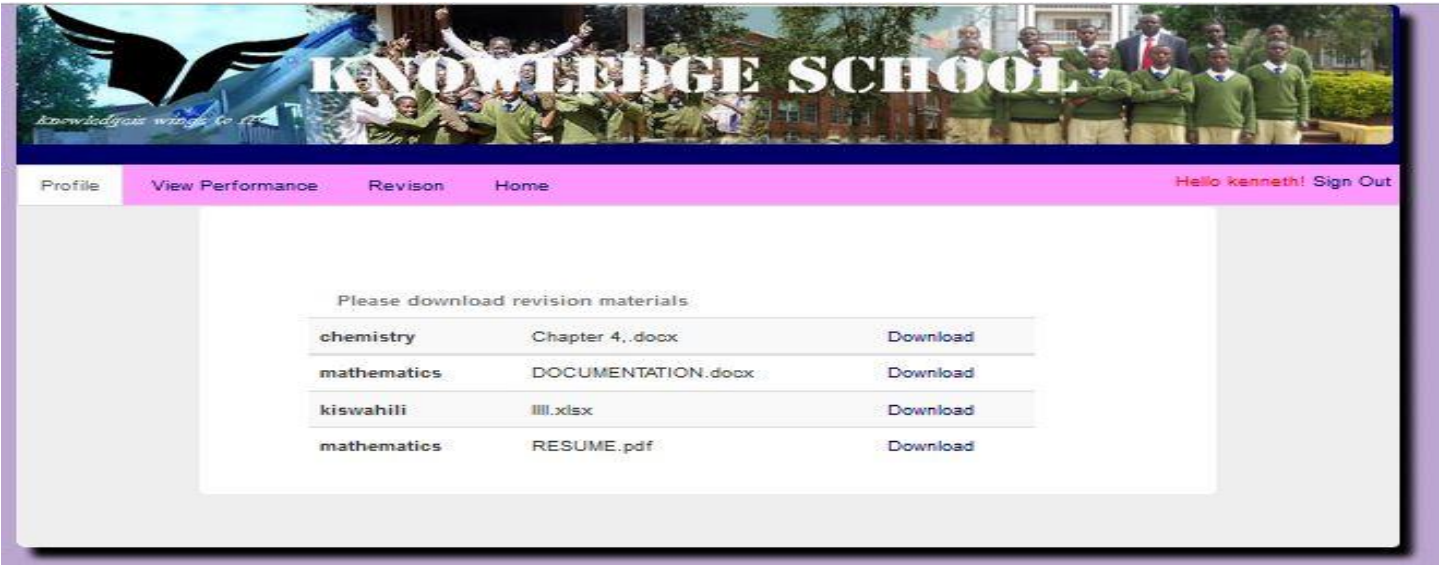


Figure 15: A student account containing revision materials to upload from respective subject teachers

## level 1 simple DFD

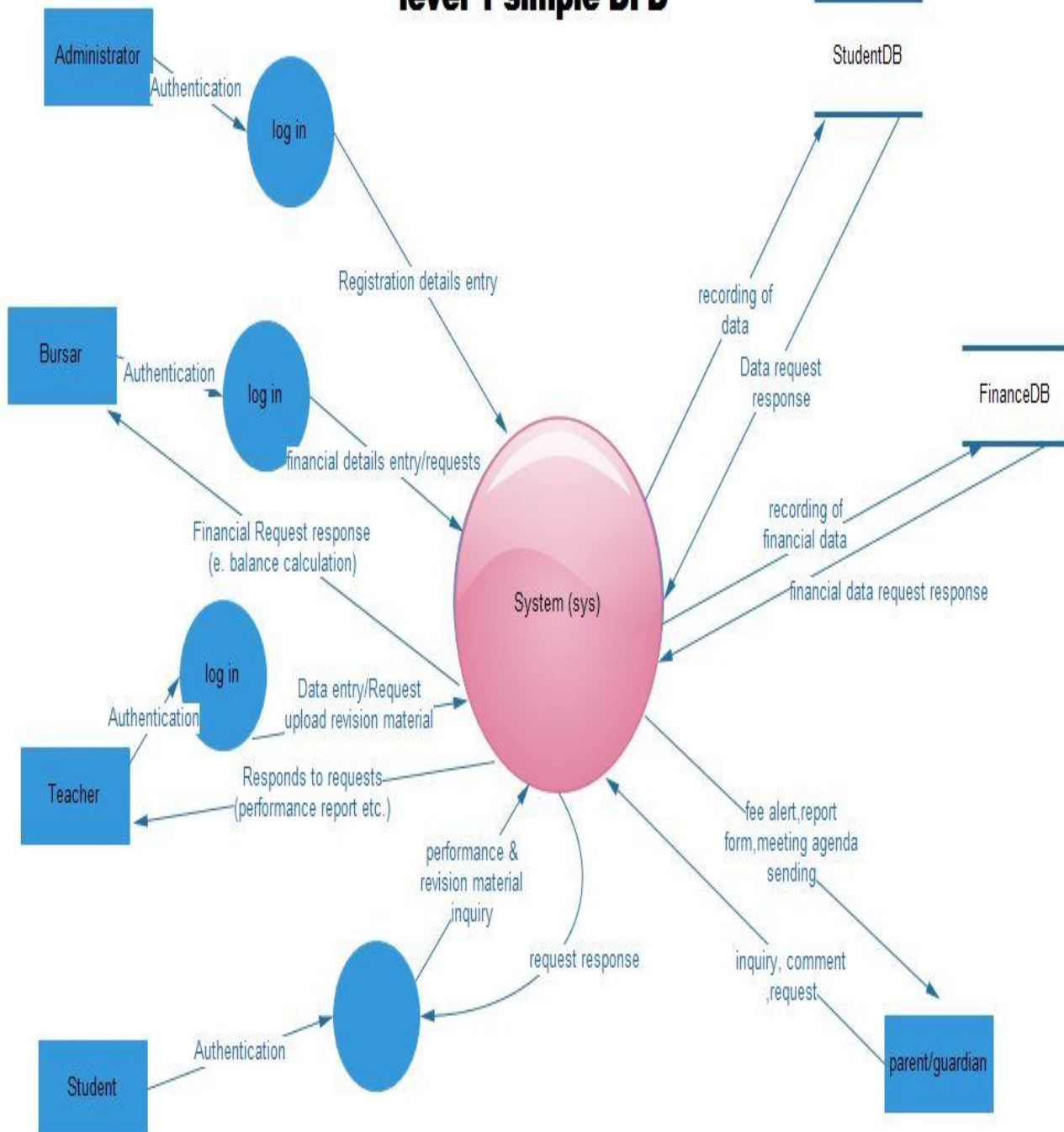


Figure 16: A simple level 1 DFD of the OSSS

### FLOWCHART DIAGRAMS

A **flowchart** is a type of diagram that represents an algorithm, workflow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation illustrates a solution model to a given problem. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields.

#### TEACHER MODULE FLOWCHART DIAGRAM

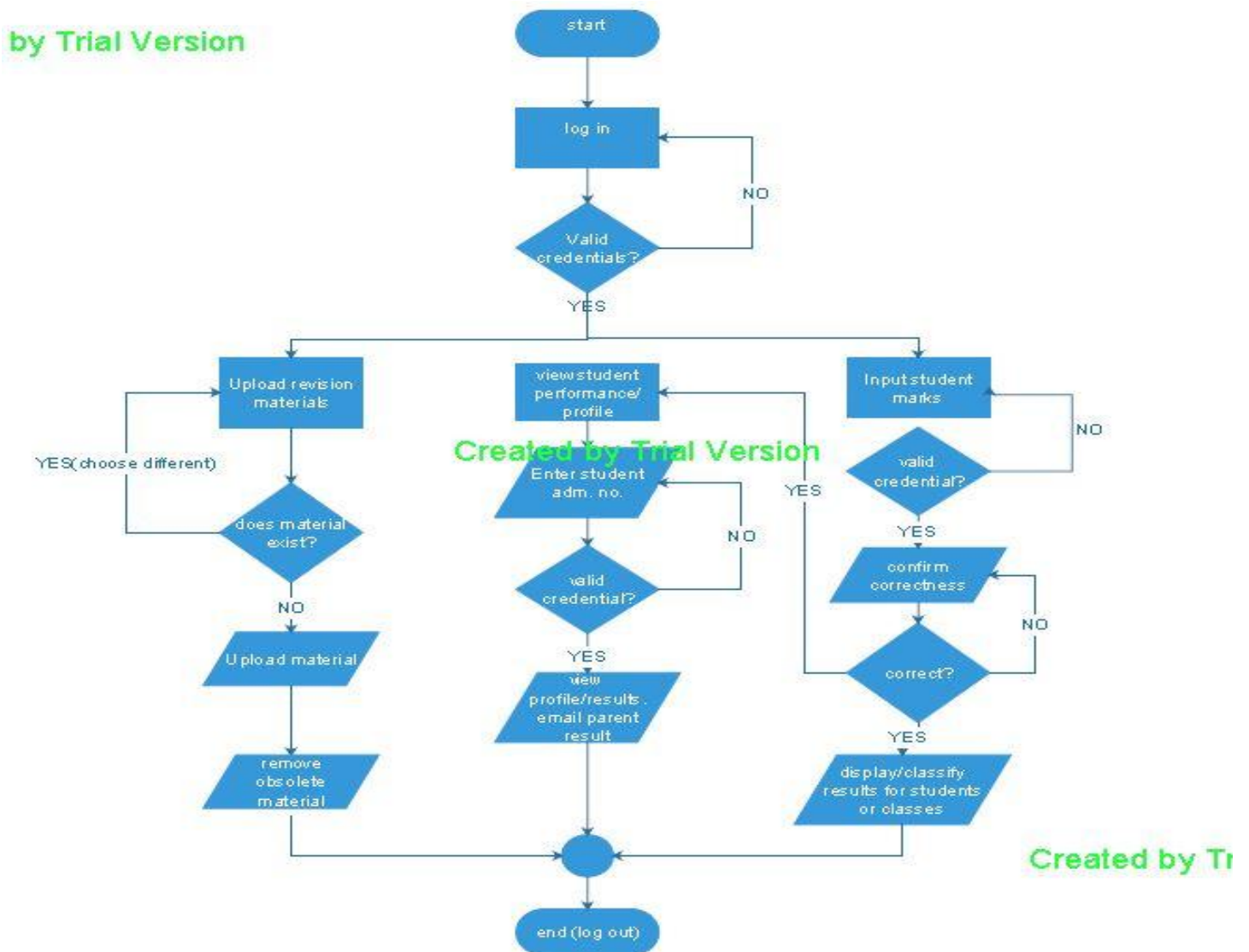
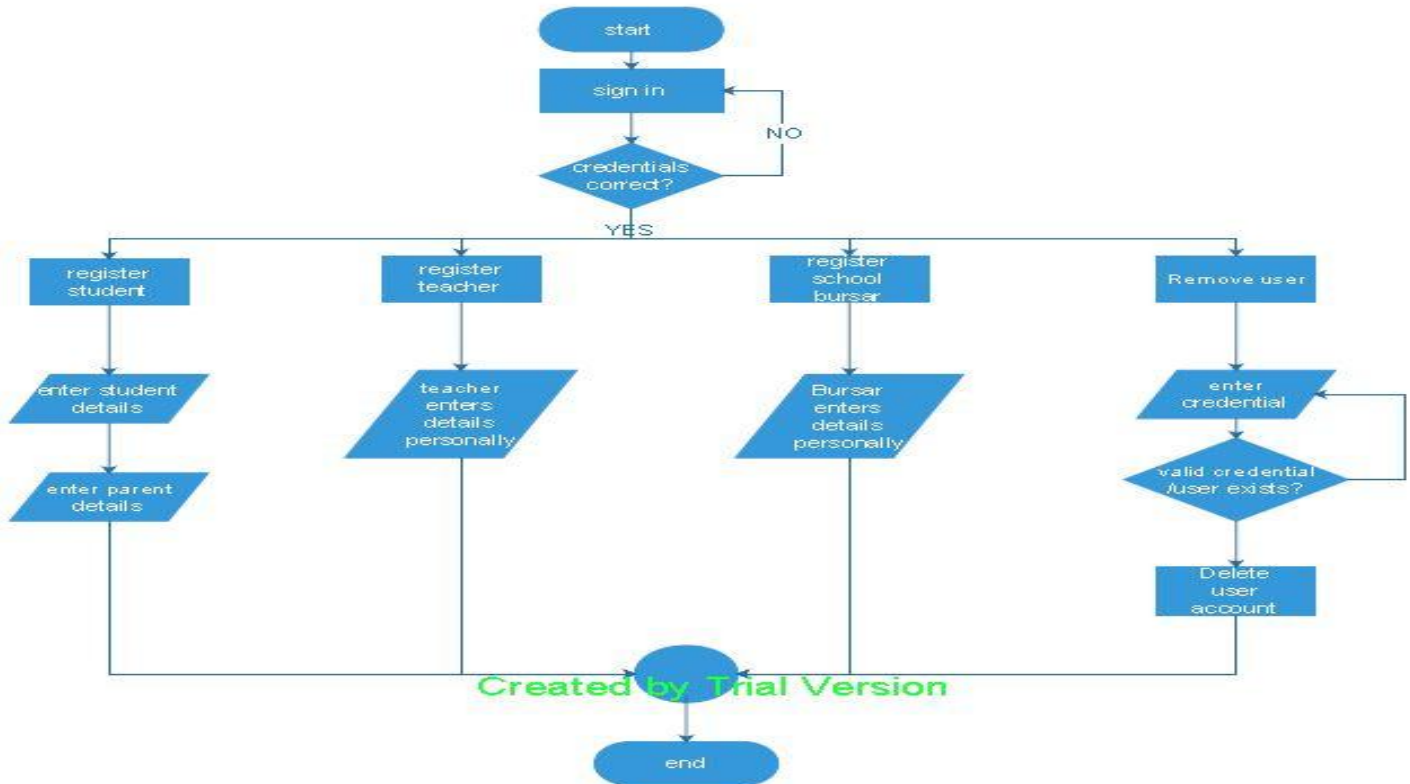
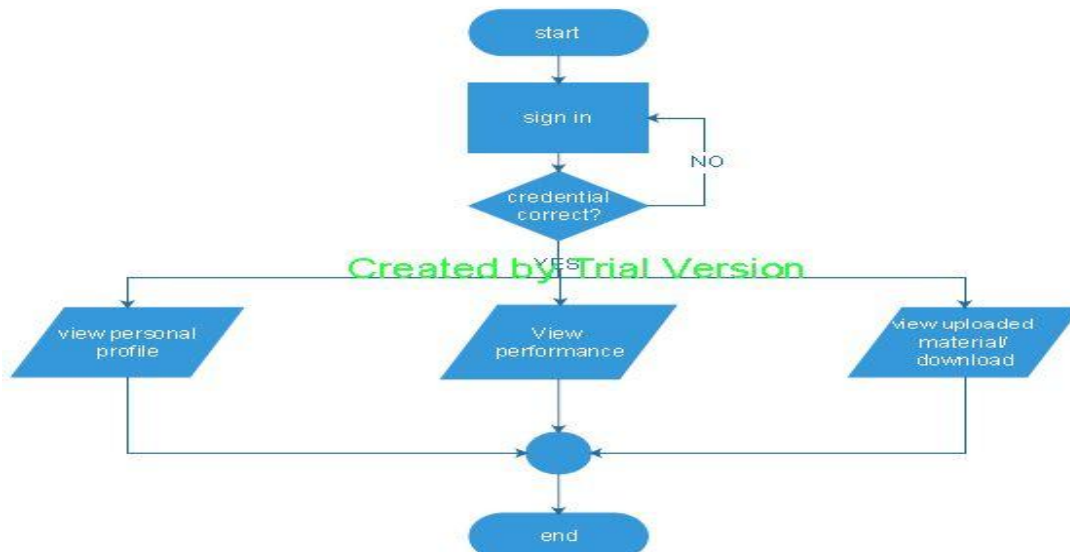


Figure 17: A flowchart of how teacher interacts with the system

## ADMINISTRATOR MODULE FLOWCHART



## STUDENT MODULE FLOWCHART



USECASE DIAGRAM OF THE SYSTEM

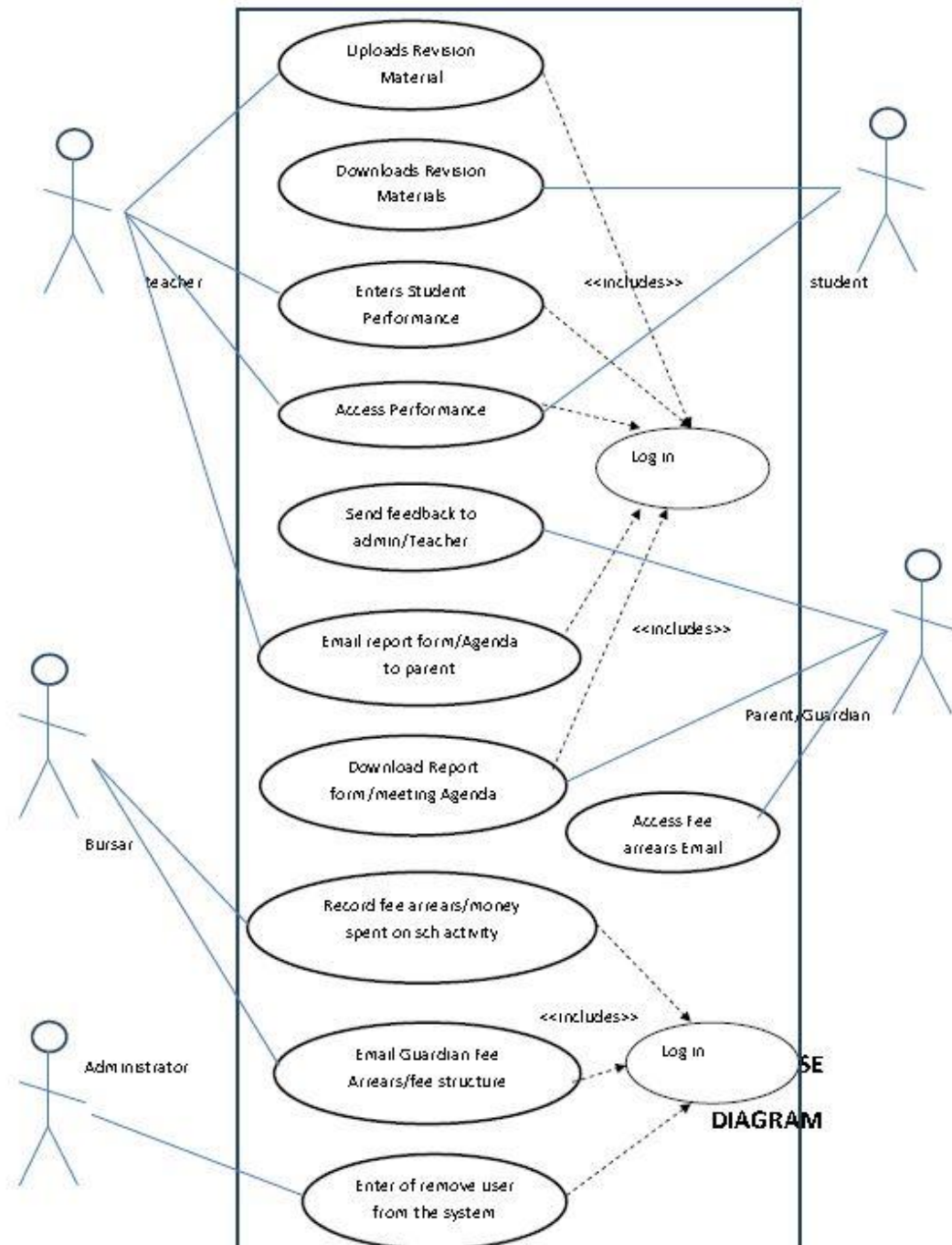


Figure 18: Use case diagram of OSSS

A **use case diagram** (above) at its simplest is a representation of a user's interaction with the system and depicting the specifications of a use case. A use case diagram can portray the different types of users of a system. In our case we have 5 different users of the system. The use case simply show how the respective user interacts with the system.

### ***DATABASE DESIGN***

This is a shared collection of data that are related or files that are to meet the immediate need of authorized users. These data may be in form of text, numeric, date or encoded images.

#### **Data Dictionary** (R/SHIP & HOW THEY CONNECT IS SHOWN ABOVE)

<b>StudentDetails</b>			
<b>ATTRIBUTE</b>	<b>TYPE</b>	<b>LENGTH</b>	<b>RULES/VALIDATION</b>
FNAME	CHAR	20	required
MNAME	CHAR	20	required
SNAME	CHAR	20	required
<u>ADM NO.</u>	INTEGER	5	required
CLASS	VARCHAR	2	required
D.O.B	VARCHAR	20	required
PARENT ID NO.	INTEGER	15	required

studentDetails table will serve as a repository for student details that will be used in the system by other users for various functions.

<b>ParentInfo</b>			
<b>ATTRIBUTE</b>	<b>TYPE</b>	<b>LENGTH</b>	<b>RULES/VALIDATION</b>
FNAME	CHAR	20	required
MNAME	CHAR	20	Required
SNAME	CHAR	20	Required
<u>ID NO.</u>	INTEGER	15	Required
EMAIL	VARCHAR	50	Required
PHONE NO.	INTEGER	20	Required
ADM NO.	INTEGER	5	required

Parentinfo table will serve as a repository for parent details that will be used in the system by other users for various functions.

StudentFinancialRecords			
ATTRIBUTE	TYPE	LENGTH	RULES/VALIDATION
CLASS	VARCHAR	2	Required
<u>ACC. NO.</u>	INTEGER	5	Required
AMOUNT SUBMITTED	INTEGER	-	Required
REMAINING BALANCE	INTEGER	-	required

Involves financial details involving the students; includes paid amount and fee balances.

Class			
ATTRIBUTE	TYPE	LENGTH	RULES/VALIDATION
<u>ADM NO.</u>	INTEGER	5	Required
FNAME	CHAR	20	Required
MNAME	CHAR	20	Required
SNAME	CHAR	20	required
AGE	INTEGER	3	Required

Class table involves detail of each and every student. Useful during analysis, classification and generation of report forms.

ClassPerformanceRecords (every class with its own table)			
ATTRIBUTE	TYPE	LENGTH	RULES/VALIDATION
<u>ADM NO.</u>	INTEGER	5	Required
SUBJECT	CHAR	20	Depends on whether it is compulsory or an elective

**NB:** This table is to be normalized to give 4 more tables

ClassPerformance table involves performance detail of each and every student. Useful during analysis, classification and generation of report forms

TeacherInfo			
ATTRIBUTE	TYPE	LENGTH	RULES/VALIDATION
FNAME	CHAR	20	Required
MNAME	CHAR	20	Required
SNAME	CHAR	20	Required
<u>ID NO.</u>	INTEGER	15	required
CLASS	VARCHAR	2	-
EMAIL	VARCHAR	100	required
PHONE NO.	INTEGER		required

TeacherInfo table holds details of each and every teacher in the school.



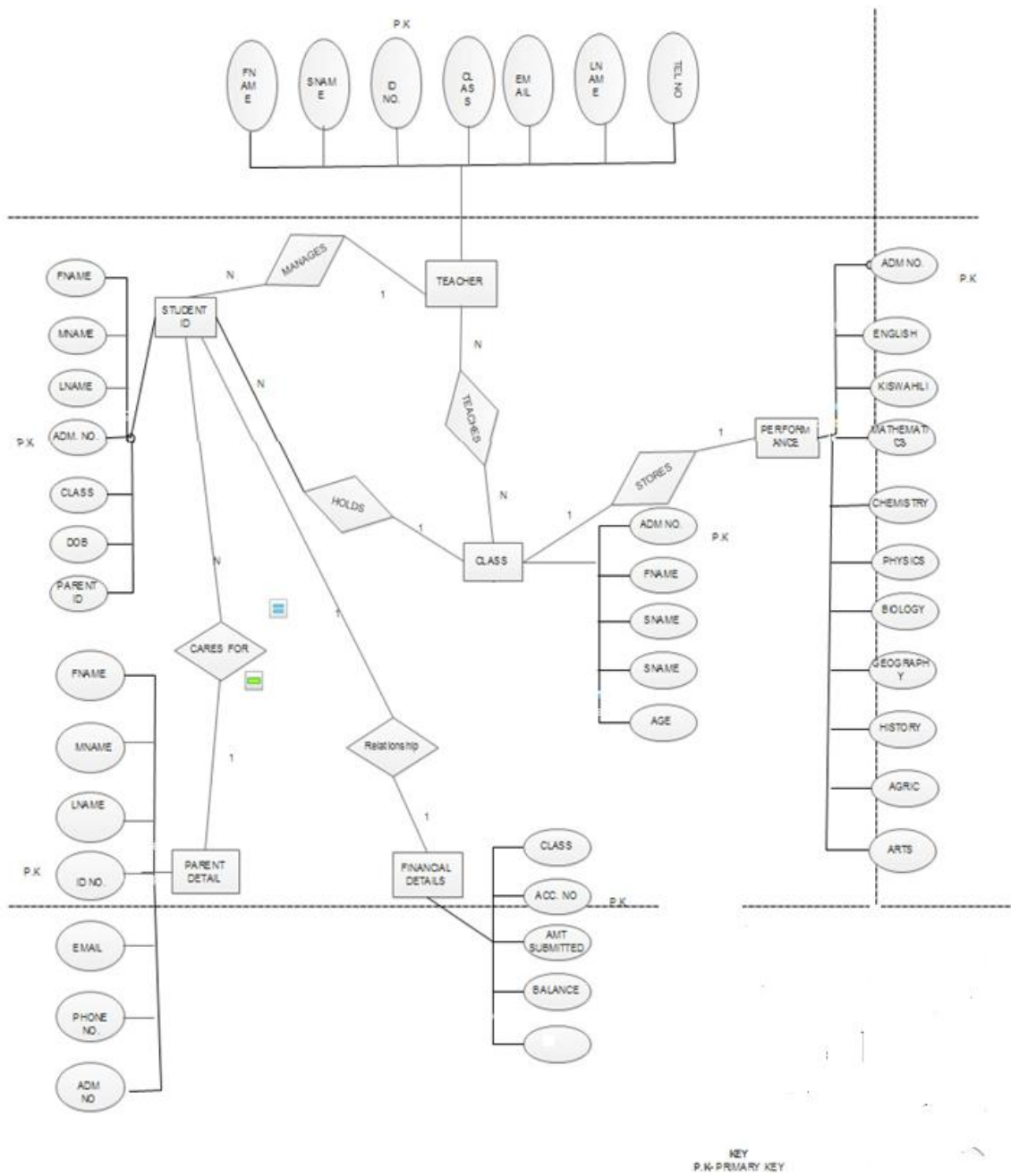


Figure 19: An ERD of OSSS depicting various tables and how they are related to each other

## REFERENCES

- Bellum, J.M. (2003). *Rogers' innovation process in organizations: information systems implementation in education organizations*. Doctorate Thesis. Nebraska: University of Nebraska.
- Telem, M.; Buvitski, T. (1995). The potential impact of information technology on the high school principal: a preliminary exploration, *Journal of Research on Computing in Education*, 27 (3). 281-297.
- Christopher, J.C. (2003). *Extent of decision support information technology use by principals in Virginia public schools*. Doctorate Thesis. Virginia: Virginia Commonwealth University.
- Kamile, Demir (2006). *School management information systems in primary schools, Turkish journal on Educational and technology*
- Telem, M. (1991). A knowledge base for information technology in educational administration. *Journal of Research on Computing in Education*, 23 (4), 594-611.
- Telem, M.; Buvitski, T. (1995). The potential impact of information technology on the high school principal: a preliminary exploration, *Journal of Research on Computing in Education*, 27 (3). 281-297.
- Van Heerden, S. H. A (1991) *Management information system for principals of primary schools*. Doctorate Thesis. University Of Pretoria, South Africa.
- <https://www.aamc.org/services/srs/>
- <http://www.campusmanagement.com/EN-US/>
- <http://www.isbe.net>
- <http://www.educationsystem.in/software-plays-most-important-role-in-schools/>
- GOK, (2010) National ICT Policy, Ministry of Information and Communication, government printers, Nairobi, Kenya

GOK, (2010) ICT Capacities and Capabilities in Secondary Schools in Kenya 2009/2010, NCST No: 046,  
Nairobi

Kenya

GOK (2006) National ICT strategy for Education and Training, Government printer, Nairobi Kenya

Kandiri, M. (2012) *A survey on ICT Access and use in Kenya secondary schools*. Summit strategies ltd,  
Nairobi Kenya

Skill Challenges in Adoption and Use of ICT in Public Secondary Schools in Kenya, LaariaMingaine